A Serological Contribution to the Taxonomic Status of *Cupriguanus*, a South American Genus of Iguanid Lizards

José M. Cei and Luis P. Castro
Instituto Biología Animal,
Universidad Nacional de Cuyo,
Mendoza, Argentina

ABSTRACT—Precipitin tests enable us to discriminate the relative taxonomic relationships of different species of the iguanid genus *Cupriguanus* from Austral South America. The morphologically very similar *C. scapulatus* and *C. fasciatus* appear also nearly related serologically. Both species lie at a stronger serological distance from the isolated and more differentiated form *C. achalensis*.

Gallardo (1964) described a new genus *Cupriguanus* from Argentina with two new species *araucanus* and *achalensis*, separating moreover *scapulatus* (Burmeister) from the former artificial genus *Urostrophus* Dumeril et Bibron, which at present is assigned to only three disjoint forms: *vautieri* Dum. and Bibr. from the subtropical forest of Argentina and Bolivia, *torquatus* (Philippi) and *valeriae* Donoso Barros from the *Nothofagus* forest of Southern Chile. Another species of *Cupriguanus*, *casuhatiensis* Gallardo, has been recognized later (1968). *Cupriguanus araucanus* is now considered as a synonym of *Cupriguanus* (*Leiosaurus* = *Pristidactylus*) *fasciatus* (D'Orbigny) (Barrio 1969; Cei 1973). Likely *Leiosaurus bardensis* Gallardo (1968), from Western Argentina, can be regarded as a *Cupriguanus* form strongly mimetic with *C. fasciatus* (Cei and Roig: paper in press).

The genus has been defined using characters of external morphology (Gallardo, 1964; Cei, 1973). In spite of its consistent physiognomy, it is often very hard to identify the species of the group because of the lack of clear cut morphological diagnosis, generally involving a number of trivial somatic features, such as the comparative tail and body length or small differences in lepidosis. The recent Catalogue of the Neotropical Squamata by Peters and Donoso Barros (1970) point out alike the precariousness of the interspecific boundary of *Cupriguanus*, drawn up from the original descriptions. That is evident enough in the case of *Cupriguanus scapulatus* and *C. fasciatus*. Both species should be distinguished by the number of the cephalic scales in contact with rostral, or between nasal and rostral. However the individual variation of such characters in any compared samples is a troubling obstacle for any unquestionable identification of the lizards, similar too in their color pattern and sex dimorphism.

The present paper is attempting to contribute by means of another kind of information to the biosystematics of the following species of *Cupriguanus*: *scapulatus*, *achalensis* and *fasciatus*. We used the precipitin tests and the Libby's photronreflectometer to analyze the serological relationships between the above mentioned forms. Their blood sera were obtained simultaneously by cardiac puncture, and antisera were produced in rabbits using the Freund's adjuvant. Details on procedures and methods have been provided previously in several papers by Boyden et al. (1943; 1947; 1950; 1971), Gemeroy (1943), Wayne Frair (1969) and ourselves (Cei and Castro, 1970). The localities of the studied samples of lizards and the present distribution patterns of the recognized species of the genus *Cupriguanus* are indicated in the sketch of fig. 1.

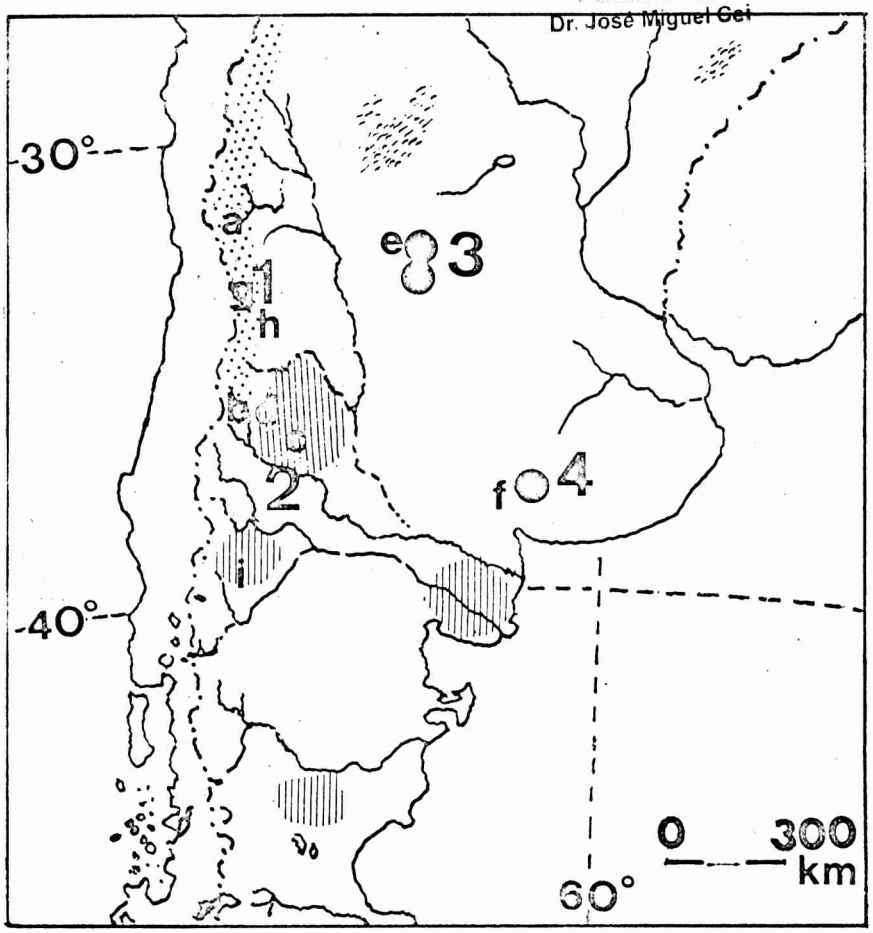

Figure 1. Distribution patterns of the reported species of the genus *Cupriguanus* from Western and Southern territories of Argentina.

Dotted area: Andean range of *C. scapulatus*, above 2500 m (1). Hatched areas: reported distribution of *C. fasciatus* (2). Black circles: isolated populations of *C. achalensis* from Sierras Grandes, Cordoba (3), and *C. casuhatiensis* from Sierra de la Ventana, Southern Buenos Aires Province (4). Localities of the samples: a—Uspallata plateau; b—Choique Pass; c—Payún Volcano; d—Batra stream; e—Pampa Achala; f—Sierra de la Ventana; g—Portillo; h—Pareditas; i—Neuquen.

The results of the serological comparisons are shown in Table 1. The values of the cross-reactions between *C. scapulatus* from Uspallata plateau, North Mendoza (3000 m) and *C. scapulatus* from the Choique Pass (2500 m) some 450 km southward, indicates a simple populational difference, above a 90% relationship. The serological distance slightly increases (84.8–87.0%) between both *scapulatus* populations and *C. fasciatus*, from the Payún volcanic plateau (2000 m) and the Batra stream (1800 m), the last locality being placed at only 50 km from the Sierras of the Choique Pass. However the results indicate a relatively distant relationship between both *scapulatus* and *fasciatus* and *C. achalensis* from Sierras Grandes de Cordoba (Pampa Achala, 2000 m) an ancient extra-cordilleran granitic relief, uplifted during the Andean orogenetic crisis, in the Cenozoic time. *Cupriguanus scapulatus* is placed much closer (80.1–82.8%) to *C. achalensis* than *C. fasciatus* (71.8–74.7%) to *C. achalensis*. It means a somewhat longer evolutionary period during which the serum proteins of these

Table 1

Results of precipitin tests: Iguanid Lizards of the *Cupriguanus* group.*

	Antisera			
	C. scapulatus USPALLATA	*C. scapulatus* CHOIQUE	*C. fasciatus* PAYÚN	*C. achalensis* PAMPA ACHALA
Antigens				
Cupriguanus scapulatus USPALLATA	100	91.2	87.0	80.8
Cupriguanus scapulatus CHOIQUE	93.7	100	—	81.8
Cupriguanus fasciatus PAYÚN	84.8	86.5	100	74.7
Cupriguanus fasciatus BATRA	—	84.8	—	—
Cupriguanus achalensis PAMPA ACHALA	82.7	80.1	71.8	100
Leiosaurus belli PAREDITAS (Mendoza)	—	61.9	—	—
Diplolaemus darwini PORTILLO (Mendoza)	68.9	—	—	—
Diplolaemus darwini NEUQUEN	—	—	—	68.6

* The comparative homo-heterologous values (in percent) when different specific antigens were tested against four anti-*Cupriguanus* sera.

last species have been evolving independently, in full accordance with the geological space of isolation and with their present geographical disjunction, in comparison with the neighbouring *scapulatus* and *fasciatus*. Moreover, if the available diagnostic, morphological characters are very faint or doubtful between *scapulatus* and *fasciatus*, they appear more evident between *scapulatus—fasciatus* and *achalensis*. For instance the yellow-green venter and the fourth toe much longer than third of *achalensis*, are somewhat significant and distinctive features in both species. Finally, a few tests reported in Table 1 illustrate the increasing serological distance between the whole *Cupriguanus* group and some representative genera of the same phyletic stock, such as *Diplolaemus* and *Leiosaurus*. It is remarkable that the same percent values (68.6–68.9) are obtained between *Cupriguanus scapulatus* or *Cupriguanus achalensis* and *Diplolaemus darwini*, either from Mendoza and Neuquen localities, at a geographical interval of some 600 km.

Taken as they appear, the present data justify the conclusion that the serum proteins of the morphologically related species *Cupriguanus scapulatus* and *C. fasciatus* are more similar than the correspondent antigenic systems of *C. achalensis*. That lizard is characterized by a number of more distinctive somatic characters relating it to the farthest, isolated form *C. casuhatiensis* from Sierra de la Ventana (1000 m) in the Buenos Aires province, at a distance of 700 km. *Cupriguanus casuhatiensis* is a rare species, hitherto not available for our present study. The serological kind of evidence seems to point out two chronological steps of the evolutionary divergence of the genus *Cupriguanus*, likely originated from a distant Patagonian ancestry, such as the related iguanid stocks *Diplolaemus* and *Leiosaurus*. A first step, which is supported by the evidence of the distributional records, may account for the early peripheric fragmentation of the ancestors, through the late Tertiary. The relic extra-cordilleran forms *achalensis—casuhatiensis* are the present adapted inhabitants of the isolated granitic embossments of the Cordoba and Ventana Sierras. A more recent stage of speciation may be postulated for the apparently allopatric forms *scapulatus* and *fasciatus* (probably *hardensis* too). The high degree of serological relationships between *scapulatus* and *fasciatus* is in accordance with their still uncertain morphological separation. It indicates that these nearly related species have had a not very long diverging evolutive pathway. Probably some unknown adaptive or physiological isolating mechanisms could assure their present status as incipient species in spite of the remarkable topographical similarity in the South of the Mendoza province.

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